Dictators and their Viziers: Endogenizing the Loyalty-Competence Trade-off*

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Abstract

The possibility of treason by a close associate has been a nightmare of most autocrats throughout history. More competent viziers are better able to discriminate among potential plotters, and this makes them more risky subordinates for the ruler. To avoid this, rulers, especially those which are weak and vulnerable, sacrifice the competence of their agents, hiring mediocre but loyal subordinates. Furthermore, any use of incentive schemes by a personalistic dictator is limited by the fact that all punishments are conditional on the dictator's own survival. We endogenize loyalty and competence in a principal-agent game between a dictator and his viziers in both static and dynamic settings. The dynamic model allows us to focus on the succession problem that insecure dictators face.

Keywords: dictatorship, loyalty-competence trade-off, non-democratic politics, principal-agent, succession

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"Stanley: *Most mighty sovereign,*

You have no cause to hold my friendship doubtful.

I never was nor never will be false.

King Richard: *Go then and muster men. But leave behind*

Your son, George Stanley. Look your heart be firm,

Or else his head's assurance is but frail."

– William Shakespeare, "Richard III," Act 4, Scene 4

"*The best way to understand the way Stalin worked is to ...*

re-read Shakespeare's Richard III."

– S.E.Finer, "The History of Government from the Earliest Time"

1 Introduction

Authoritarianism is one of the oldest forms of government (see Tullock, 1987, Olson, 1993), yet it attracted little attention of political economists until very recently.[1] While the number of democratic countries increased significantly during the last decades of the 20th century, dictatorships still account for almost one half of the world's current population. There is also a non-negligible number of relatively new dictatorships, especially in countries of the former Soviet Union such as Turkmenistan, Uzbekistan, and Belarus. In this paper, we focus on the internal structure of the most personalized dictatorships, especially those that have exhibited strikingly poor governance (for the most recent examples, see, e.g., Stepan and Linz, 1978, Bueno de Mesquita et al., 2003, Haber, 2005).

Why do dictators, who presumably fear that poor economic performance or the inability to carry out political repressions might cost them their position in power, appoint incompetent cronies or relatives to crucial economic and military positions in government? While incompetent ministers are arguably not unusual in democratic countries, historians and political scientists would agree that personalized dictatorships are especially marred by incompetence. (Section 2 discusses broad historic and political evidence.) In such regimes, the main problem for an autocrat might be not the incompetence, but the possible disloyalty, of a vizier. Haber (2005) observes that "virtually all constituents and colleagues in dictatorships – at least those who value their necks – profess loyalty

[1] For an overview of the state of the art in the formal work on dictatorship see Acemoglu and Robinson (2005), Bueno de Mesquita et al. (2003), and Wintrobe (2002). Acemoglu (2003), Acemoglu, Robinson, and Verdier (2004), Acemoglu and Robinson (2005), and Galliego and Pitchik (2004) suggest dynamic frameworks for studying modern dictatorships. Recent empirical studies of dictatorships include Epstein et al. (2004), Przeworski et al. (2000), Przeworski and Limongi (1993), Gandi (2005), and Wantchekon (2000).

to the dictator, even as they conspire against him". Brooker (2000) finds that military coups are attempted against dictators at least twice as often as against democratic rulers. Not surprisingly, Wintrobe (2000) concludes that paranoia is "the most likely personality characteristics possessed by dictators". Most recently, military experts pointed out that even under increasing outside threat, Saddam Hussein placed incompetent loyalists to the crucial positions and blocked communication between field-level commanders as he feared a plot (Gordon and Tailor, 2006).[2]

We present a simple contract-theory model to analyze the loyalty vs. competence trade-off in a dictatorial political environment. Facing a potential challenger of an unknown strength, a dictator hires a lieutenant (a vizier) who is more competent in determining the extent of the threat than the dictator himself; to do this, the dictator chooses from a pool of lieutenants of varying competence. Appointing a more competent vizier, the dictator benefits from both successful defense, and the detrimental effect on enemy's incentives to launch a challenge. However, the very competence of the vizier makes him more prone to treason: better knowledge of odds of winning allows him to participate in a plot even if he is offered a lower reward than a less competent person would require. A cunning vizier acts as a discriminating monopolist for possible enemies of the dictator, while an uninformed first minister acts as a normal monopolist. Assuming that the willingness of the first minister to accept a bribe is increasing both in the size of the bribe and the probability of success of the plot or a foreign invasion, the ruler trades off the loyalty of his first minister (lower willingness to accept a bribe) and his competence (higher willingness to accept bribes for treason). The trade-off a personalistic dictator faces is especially pronounced as any use of incentive schemes by a dictator is constrained by the consideration that all rewards and punishments are necessarily conditional upon the dictator's own survival.[3]

The trade-off between loyalty and competence is not new in the corporate governance literature, where the principal-agent conflict was first studied. Though the commitment problem is not so extreme in the corporate world – there are contracts and courts that enforce them – a top manager concerned with the possibility of "betrayal" by a hired agent might be willing to hire a mediocre agent rather than one of either high or low ability. Prendergast and Topel (1996) show that a principal who values the power to affect his subordinate's welfare does not necessarily appoint the most competent agents (see also Friebel and Raith, 2004, on how these considerations affect optimal

[2] See also Gordon, R., Taylor, B. "Even as U.S. Invaded, Hussein Saw Iraqi Unrest as Top Threat," *The New York Times*, March 12, 2006

[3] North and Weingast (1989) (see also Shepsle, 1991 and Acemoglu and Robinson, 2001, 2005) made the commitment issue central in political science, demonstrating in particular that a constitutionally restrained monarch (William III) might borrow more easily from his subjects than a more powerful one (Stuarts from James I to James II). The same historical context seems to support our message as well: a constrained ruler is more likely to have better ministers.

information flows inside the firm). Though the principal's primary concern is somewhat akin to that of our dictator, the analysis does significantly rely on the fact that there is a third party (the firm's management). In Glazer (2002), when agents with high ability to run a firm also possess superior skills in internal rent-seeking, the owner might be willing to hire a low-ability agent. In contrast, our model highlights that it might not be that the same person has two complementary qualities, but the very quality for which the agent is hired (competence) might be the source of potential disutility to the principal.

Prendergast (1993) demonstrates that if a subordinate's activity is rewarded based on subjective performance evaluation, then high-powered incentives, while inducing the subordinate to work harder, make her conform to the opinion of the principal (see also recent works by Morris, 2003, and Wagner, 2004). Though some of the features are similar to those of our model (e.g., that relevant information possessed by the agent is lost for the principal in equilibrium), the approaches are very different. First, we do not make use of subjective performance evaluation: if the plot fails, the dictator gets all the relevant information. Second, the vizier has no need to conform to the dictator's opinion, which he knows for sure. Burkart, Panunzi, and Shleifer (2003) investigate the trade-off between competence of a hired manager and the loyalty of a family member generally lacking that competence. In our model, loyalty and incompetence are two sides of the same token.

The rest of the paper is organized as follows. Section 2 discusses evidence from historical and political sources. Section 3 introduces the setup and starts the formal analysis. Section 4 considers self-selection of would-be viziers, while Section 5 is focused on the dynamic perspective and its implications. Section 6 concludes.

2 Agency Problems in Dictatorships

Any historic and political evidence related to the loyalty-competence trade-off is bound to be anecdotal. While for loyalty there are relatively secure *ex post* estimates, this is much less so for competence.[4] This is not to say that the issue is intractable. In this section, we discuss some systematic studies of government spanning across centuries and regimes such as Gibbon (1781), Finer (1997), Chehabi and Linz (1998), Dominguez (2002) as well as individual-regime studies such as Conquest (1967), Gregory (2004), Montefiore (2003), and Petrov and Skorkin (1999) on Stalin's

[4] Some econometric evidence comes from empirical work on military campaigns, where definition of success or failure (and thus competence and incompetence of those responsible) is relatively clear. Peceny, Beer, and Sanchez-Terry (2002) and Reiter and Stam (2003) found that personalist dictatorships are especially prone to open military conflicts with democracies (the latter paper also demonstrates that unconstrained dictators are more likely to challenge a democracy than vice-versa), despite the fact that personalist dictatorships fight wars poorly (at least since 1945).

Russia, Hartlyn (1998) on Trujilho's Haiti, Kiernan (2004) on Pol Pot's Cambodia, Lewis (1978) on Salazar's Portugal, Speer (1970) on Hitler's Germany, Young and Turner (1985) on Mobutu's Zaire, etc.

The word "vizier" comes from the Ottoman Empire, where the Grand Vizier was, essentially, a prime-minister appointed by the sole sovereign (sultan). Viziers typically played a crucial role in palace revolutions throughout the 12th–19th centuries (Finer, 1997). We use this word as our model can be most directly applied to "the palace" regimes in Finer's typology of governments (Finer, 1997, I:38) and neo-sultanistic regimes (Chehabi and Linz, 1998), their modern counterpart (see below). Historical examples include ancient kingdoms and empires such as Byzantine, Roman, Persian, and Chinese, and absolutist European monarchies of 17th and 18th centuries. Still, palace courts played enormous role even in modern dictatorships such as that of Hitler (Speer, 1970) and Stalin (Montefiore, 2003).

As early as in 1965 BC, i.e. almost four thousand years ago, King Sesostris I of Egypt warned future kings in his instruction: "Be on your guard against all subordinates, because you cannot be sure who is plotting against you" (Rindova and Starbuck, 1997). Han Fei Tzu, a Chinese philosopher of the 3rd century BC, advised rulers to distrust subordinates and inspire fear in them. Finer (1997: I, 545) notes that until Trajan most Roman emperors lived in real or imaginary terror of enemies. Many ancient and medieval rulers hired foreign bodyguards, who were less able to take power themselves than the local military. Finer (1997, I:18): "A ruler [in contrast with the political regime, of which he is a focal part] might fancy himself more secure when surrounded by a band of foreign mercenaries." In *The Twelve Caesars*, Suetonius (110CE, 1979) mentions foreign body-guards protecting Caligula, the foremost example of an unconstrained ruler fearing betrayal.

The institute of eunuchs, infertile human males, is a specific example of how ruler's fears of betrayal and undesired succession have been institutionalized. The very idea of having eunuch as a close subordinate is related to the fact that under no circumstances a eunuch can be a legitimate head of the state, exactly for the reason he is infertile. Throughout history, they have been a significant part of courts in Persia, Egypt, Ancient Greece and the Roman Empire. In China, by the end of Ming Dynasty, the Imperial Palace employed no less than seventy thousand eunuchs. Finer (1997, I:575) observes that the careers of eunuch Grand Chamberlains Eusebius, Eutropius, Chrysaphius, and Eutherius demonstrate that each was the principal minister of their respective emperor. Hopkins (1978, 179) points out that not only these eunuchs, but many much humbler ones have had "tremendous and sustained influence" on court decision's and emperors' succession. Discussing the rise and institutionalization of eunuchs, Finer (1997, I:575) notes a close parallel between the Chinese Han empire and the decline of the Roman Empire; as an emperor became

more sacred (which required more and more layers of bureaucrats between him and his subjects) and subsequently less accessible, he became more vulnerable. Gibbon (1781, II:Ch. 19) argues at length that Constantius II "feared his generals and mistrusted his ministers" and that was true to all of the Roman emperors in 4th century.

Two millenia from Romans, Portugal's Salazar and Germany's Hitler, Soviet Russia's Stalin and Cambodia's Pol Pot, Zaire's Mobutu and Iraq's Hussein, Romania's Ceausescu and Turkemenistan's Niyazov might have exhibited considerably different life-paths and individual habits if taken individually. However, apart from being exceptional political manipulators, they were strikingly similar in organization of their courts and broad regimes.

Considering the rule of Salazar, the Portuguese dictator in the period 1932–1968, Lewis (1978) identifies the problem of self-selection of subordinates: "[Salazar] was ... intolerant of those who did not share [his own views] to the last degree. That discouraged many talented young men from entering the government service." With Salazar's power increasingly secure, 'the patterns of recruitment show the regime evolving from its military and semi-fascist beginnings in the direction of a modern technocratic state' (Lewis, 1978).

Petrov and Skorkin (1999) provide a striking illustration of the loyalty-competence trade-off through an examination of the educational level of top officers of the NKVD, Stalin's praetorians that had been a major political authority during the era of "great purges" (1934–1941). Literally, NKVD stands for the "Ministry of Internal Affairs", but in practice it, as the "armed hand" of the Communist Party, exercised control of almost all aspects of life in the USSR (Conquest, 1967, Gregory, 2004). In 1934, 41 percent of top officers (39 officers) had less than 7 years of total schooling, and another 42 percent had less than 10 years. In 1937, the peak year of purges, these numbers were 37 and 43 percent, respectively.

Montefiore (2003) focuses his work on Stalin's inner circle, and provides overwhelming archival evidence on fear of betrayal, which was typical for Stalin and his closest subordinates (both Montefiore, 2003, and Gregory, 2004, use top-secret archival documents made available for researchers only recently). One result was a total devastation of Russian military in the period immediately preceding World War II (Volkogonov, 1998: 370-71, 405-409; Spahr, 1997:231). At the same time, a sudden change in circumstances might bring a sudden change in the dictator's strategy. In October 1941, when the German forces were advancing to Moscow with a speed exceeding all forecasts, Stalin brought back hundreds of top military commanders, purged 3-5 years before, from concentration camps and prisons (Spahr, 1997, Glazer, 2002). (Table 1 in Section 4 illustrates choices by both safe and vulnerable dictators in different circumstances.)

In his memoirs, Albert Speer, once a second-highest ranked official in the Third Reich and a

confidant of Hitler, used the words "negative selection" in his description of Hitler's court, discussing at length the ignorance and incompetence of Hitler's closest subordinates (Speer, 1970).[5] Further into the World War II, the more military commanders, even those who were successful in the battlefield, e.g. Field-Marshal Rommel, were replaced by Nazi loyalists; with stakes rising, the competence became less important than personal loyalty to the Fuhrer. During the Nuremburg trials, one of the foremost Nazi loyalist, the foreign minister Ribbentrop produced examples of both his unquestionable loyalty (he claimed that he is still eager to carry any Hitler's orders) and outright stupidity[6].

In more recent times, one dictator that apparently valued loyalty higher than even basic education was Pol Pot, the leader of the Khmer Rouge movement in Cambodia, who upon taking power in 1975 attempted to execute all public servants, teachers, and anyone with a higher education or being a public servant or a teacher (Kiernan, 2004). Pol Pot's regime lasted for three years and cost Cambodia over 1.7 millions of lives, more than a fifth of the entire population. (Cook, 2004, Heder and Tittemore, 2004).

Chehabi and Linz (1998a) identify a certain type of dictatorships, which they dub, following Max Weber, the "sultanistic regimes". These include, among others, the regimes of Idi Amin in Uganda, Nguema in Equatorial Guinea, Duvalier in Haiti, Batista in Cuba, Trujilho in the Dominican Republic, Rezva Shah in Iran, Mobutu in Zaire, Marcos in the Philippines.[7] Each of the regimes has been characterized by selection of dictator's subordinates basing on personal loyalty; economic performance, at least at their respective age of maturity, was dismal. Such different personalities as Mobutu Sese-Seko, Ferdinand Marcos, and Jean-Claude Duvalier brought up corps of technocrats in their governments so that they could, in words of Marcos himself, "sit back and let technocrats run things", but "the political leadership then allowed the unconstrained introduction of exceptions that made complete mockery of the spirit and letter of the plans" (Hutchcroft, 1991). At the same time, Mobutu encouraged military officers to report rumors to him personally; in 1978, nearly 10 percent of officer corps were dismissed overnight since the dictator doubted their loyalty (Young and Turner, 1985). Katouzian (1998) observes that the Shah's fear of a military plot made the Iranian army incapable to carry most simple tasks.

Thompson (1998) bases his study of the Marcos's regime on an account by Primitivo Mijares, who was the Philippines chief propogandist and a close of advisor of the dictator before publicly

[5] Apparently, Speer does consider himself a counterexample that only proves the rule.

[6] Prosecution: "What further pressure could you put on the head of a country beyond threatening him that your Army would march in, in overwhelming strength, and your air force would bomb his capital?" Ribbentrop: "War, for instance." Nuremberg Trial materials, April 1, 1946.

[7] If in 1998, when the book edited by Chehabi and Linz came to print, the Turkmenian regime of Saparmurat Niyazov was a "sultanistic regime candidate"; by 2006, it is certainly so.

defecting and exposing the sultanistic nature of the regime. The "traitor" was later either lured or tricked into a return journey to the Philippines, where he was executed alongside with his son. For the Marcos regime, appointment of loyal and incompetent cronies to key government positions was a rule, rather than an exception (e.g., Marcos's chauffeur was appointed the chief of all security forces, Thompson, 1998).

The ultimate manifestation of emphasis on loyalty at the expense of competence is appointment of close relatives to the government position which require either political or professional competence – that is, making the regime less competitive and less stable. Chehabi and Linz (1998b) consider this a characteristic trait of sultanistic regimes. In socialist Romania, in a reminiscent of medieval regimes, key government position were held by four brothers, wife (as a second-in-line in the ruling party leadership and the President of the Romanian Academy of Science), and son (as a designated successor famous for his gambling and drinking habits) of President Ceausescu; in a secular dictatorship of Saddam Hussein, most of government posts were occupied by his relatives. (Stalin's son Vassily was made a commander of an elite Air Force division, Montefiore, 2003.)

Hartlyn (1998) observes that the role of Ramphis, Trujilho's son who was made a full colonel at the age of four and brigadier general at the age of nine, "highlighted the fact that the morale, autonomy and abilities of the armed forces were affected by nepotism". Analyzing both general patterns and specific examples of replacement of professionals in armed forces by personal loyalists in Batista's Cuba, Dominguez (1998) concludes: "It was these unprofessional, politicized officers who faced Fidel Castro's insurgency and lost."

In a search for a "perfect dictatorship", Domínguez (2002) studies the most successful dictatorships of the 20th century: Mexico, Brazil, Chile and South Korea. He argues that all of them employed talented people, at least in the early years of the regime. However, in maturing regimes, personalist and institutionalized dictatorships diverged with respect to political competence. In a personalist dictatorship such as South Korea under Park Chung Hee's rule, competent people were driven out of the government with the establishment of the loyalty-based Yushin system in 1971. Brazil and Mexico, with their institutionalized succession within an authoritarian regime, have had significantly fewer of these problems.

3 The Model

There are three strategic players in the model: the incumbent Dictator, Vizier, who is Dictator's agent, and Enemy, who wants to oust Dictator. The threat to Dictator's power depends on Enemy's type, which might might be either strong, $t = Strong$, or weak, $t = Weak$. A strong enemy type will be the victor in the fight with Dictator, unless Vizier remains loyal; a weak enemy type will lose

the fight. Obviously, t does not need to be interpreted exclusively as Enemy's attribute; it might easily reflect the vulnerability of Dictator in a given period. To allow for both interpretations, we assume that none of the players know Enemy's type for sure until the end of the game, but get noisy signals about it.

For an Enemy, the *ex-ante* probability of being of type $t = Strong$ is p. Before deciding whether or not to launch a coup, Enemy acquires information about his chances to oust the incumbent Dictator. Formally, Enemy receives a signal $z \in [0,1]$, which is random with the following distribution. If $s = Strong$, then p.d.f of z is given by $f_s(z) = 2z$; if $s = Weak$, p.d.f is given by $f_w(z) = 2(1-z)$. Hence, if signal z is received, Enemy's posterior probability that he is strong equals

$$\mu(z,p) = \frac{2zp}{2zp + 2(1-z)(1-p)}.$$

For the sake of simplicity, we will assume that the *ex-ante* probability p is equal to $\frac{1}{2}$; then the posterior probability of being strong equals $\mu\left(z, \frac{1}{2}\right) = z$.

To protect himself, Dictator needs to make a decision on whether or not he needs to take costly precautionary measures. Without these measures, the coup against Dictator succeeds if Enemy is strong, and fails if Enemy is weak. If Dictator survives the potential coup, he receives utility of Y; if not, his utility is normalized to 0. Precautionary measures cost Dictator C, $0 < C < Y$, and ensure Dictator's safety. Thus, Dictator trades off the benefits of taking precautionary measures and their costs.

From Dictator's point of view, the probability that Enemy is strong is $\mathbf{P}(t = Strong) = q$, which in turn is determined by Enemy's equilibrium strategy. Dictator is unable to to get any information on the whether or not Enemy is strong himself, so he hires an agent, Vizier. An agent himself might be imperfectly informed; however, Dictator has access to a pool of viziers with varying level of competence, $\theta \in [0,1]$. Conditional on Enemy's true type being weak, $t = Weak$, Vizier of type θ gets the signal $s = Weak$ with probability θ:

$$\mathbf{P}(s = Weak \mid t = Weak) = \theta.$$

while the strong Enemy is recognized with certainty: $\mathbf{P}(s = Strong \mid t = Strong) = 1$.[8]

Vizier reports the signal $a \in \{Strong, Weak\}$ to Dictator. However, Vizier may deliberately misinform Dictator by reporting that Enemy is weak when the signal is $s = Strong$, or that Enemy is strong when $s = Weak$. We say that Vizier *betrays* Dictator whenever $a \neq s$.

Vizier has incentives to betray as he expects to be rewarded by Enemy conditional on a successful coup. Enemy's ability to pay for Vizier's betrayal is denoted by $\overline{B}$, and is stochastic from Dictator's

[8] The assumption is made for expositional simplicity: the results go through for any $\mathbf{P}(s = Strong \mid t = Strong)$.

viewpoint. The p.d.f. is $g(x) = 1/\overline{B}$ if $x \in \left[0, \overline{B}\right]$, and $g(x) = 0$ otherwise.

Dictator provides Vizier with an incentive contract, in which payments are conditioned on all the information that Dictator possesses if he stays in power. If the enemy decided not to mount a coup, Dictator pays w_n to Vizier. If the coup is unsuccesful, Dictator learns that Enemy's type was weak (for otherwise Dictator would not have survived); if Vizier betrayed, Dictator knows this. Thus, an incentive contract includes four payments: w_f, w_b, w_e, w_n, standing for "fight", "betray", "economize" and "no enemy", respectively. We normalize the most severe punishment to zero, so $w_f, w_b, w_e, w_n \geq 0$ must be satisfied.

After Enemy observes whether or not Dictator takes precautionary measures, he decides whether or not to mount a coup. The payoffs conditional on the outcome of the game are as follows. If measures were taken and Enemy decides not to attack, Dictator gets $Y - C - w_f$, Vizier gets his wage w_f, and Enemy gets 0. If there were no measures and Enemy does not attack, dictator gets $Y - w_n$, Vizier gets w_n unless he has betrayed, in which case Vizier gets 0. If Dictator takes measures and Enemy attacks, Dictator gets again $Y - C - w_f$ and Vizier gets w_f, but Enemy gets $-D$ (which is nonpositive). If no measures were taken and Enemy attacks, then the outcome depends on Enemy's strength. If Enemy is strong, then Dictator is ousted, and Vizier gets the agreed-upon reward B from Enemy. If Enemy is weak, Dictator remains in power, and Vizier gets either w_e (for economizing on the cost of defense), or w_b (for betrayal).

Assumption 1 *Throughout the paper, we assume $C < Y < A$.*

This assumption says, first, that a defense is not too costly, so that Dictator, if he had full information, would prefer to defend against a strong Enemy. Second, Enemy has a chance to accumulate more resources (A is high enough) than the dictator is willing to pay Vizier for his loyalty, so if Vizier is perfectly competent, sometimes there will be betrayals, as Dictator is never willing to pay Vizier more than Y.

Timing

The timing of the game is as follows. (The setup of the dynamic succession game is relegated to Section **??**).

1. Enemy gets an imperfect signal z about his type t, which parametrizes Enemy's odds of ousting the incumbent Dictator. Knowing z, Enemy decides whether or not to mount a coup. Dictator chooses a Vizier of type θ and offers him an incentive contract $\mathbf{w} = (w_f, w_e, w_b)$ which specifies payments conditional on information available to Dictator in all three possible outcomes, and w_n if there is no coup. Enemy and Dictator make their choices simultaneously.

2. If Enemy's choice was to prepare a coup, he acquires information about θ and $\mathbf{w}$, and also accumulates certain amount of resources $\overline{B}$, which is uniformly distributed on $[0, A]$. If Enemy decides not to prepare a coup, the game ends.

3. If Enemy prepares a coup, Vizier recognizes Enemy and gets a signal s about Enemy's type t. Enemy approaches Vizier with a take-it-or-leave-it offer $B \leq \overline{B}$ which Vizier would get, conditional on Dictator's removal, if he gives Dictator certain report a.[9]

4. Vizier reports the signal to Dictator, who then follows Vizier's advice.[10]

5. The residual uncertainty is realized; Dictator, Vizier, and Enemy receive their payoffs.

We will analyze perfect Bayesian equilibria of this game; we rule out equilibria in which Dictator ignores the Vizier's advice.

4 Analysis

4.1 Optimal Contract for Vizier

We solve for a perfect Bayesian equilibrium by backward induction. Therefore, we start by considering Vizier's actions as a function of his competence θ and an incentive contract $\mathbf{w} = (w_f, w_e, w_b)$ offered by Dictator. In doing this, we consider Enemy characteristics given; below, we endogenize Enemy's behavior, and feed the results into the solution of the Dictator vs. Vizier game.

If Vizier receives a weak signal, he has two options. If Vizier chooses to fight Enemy, he would get w_f. Alternatively, Vizier may allow the coup to unfold without taking precautionary measures. In this case, which is essentially a bet on the chance that Enemy is indeed weak, Vizier gets w_e. Thus, if Dictator wants to save C when Enemy is weak, the incentive contract should satisfy the constraint

$$w_e \geq w_f.$$

If Vizier receives a strong signal, he again has two options. Taking precautionary measures brings him w_f. Betraying, on the other hand, gives Vizier B if Enemy was indeed strong, which happens, by Bayes formula, with probability

$$\mathbf{P}(t = Strong \mid s = Weak) = \frac{q}{q + (1-\theta)(1-q)},$$

[9] In equilibrium, Vizier never accepts money if $s = Weak$ and accepts with a non-zero probability if $s = Strong$; Enemy offers Vizier the amount that makes Vizier indifferent when $s = Strong$.

[10] This assumption is without loss of generality; in equilibrium, Dictator would never appoint a Vizier whose advise he does not intend to follow. We make this assumption to economize on pay-off specification for some of out-of-equilibrium paths.

and w_b with complementary probability

$$\mathbf{P}(t = Weak \mid s = Weak) = \frac{(1-\theta)(1-q)}{q + (1-\theta)(1-q)}.$$

Vizier remains loyal to Dictator (that is, advises to take precautionary measures when warranted) if and only if the reward for loyalty in face of strong Enemy exceeds the expected reward of betrayal:

$$w_f \geq \frac{qB + (1-\theta)(1-q)\, w_b}{q + (1-\theta)(1-q)}.$$

This is equivalent to

$$B \leq w_f + (1-\theta)\frac{1-q}{q}(w_f - w_b). \tag{1}$$

We denote the expected benefit of staying loyal for Vizier, the right-hand side of inequality (1) by

$$L = w_f + (1-\theta)\frac{1-q}{q}(w_f - w_b).$$

The expected benefit of loyalty, L, is decreasing in Vizier's competence: this is a consequence of the fact that Dictator choose an optimal contract to keep Vizier loyal, and incentivizing a more competent Vizier requires a higher payment to him. Obviously, the dictator needs to keep the Vizier's payoff as low as possible in the case of betrayal.

From Dictator's viewpoint, a Vizier that gets a strong signal obeys with probability

$$G(L) = \frac{1}{A}\left(w_f + (1-\theta)\frac{1-q}{q}(w_f - w_b)\right).$$

Dictator's payoff as a function of Vizier's competence and the terms of incentive contract is determined as follows. If Vizier gets signal $s = Weak$ (which happens with probability $\theta(1-q)$), then Dictator gets

$$Y - w_e$$

(provided that $w_e \geq w_f$). If Vizier gets signal $s = Strong$ and Enemy is indeed strong, $t = Strong$ (which happens with probability q), then the Dictator's payoff is

$$(Y - C - w_f)\, G(L) + 0 \cdot (1 - G(L)) = \frac{1}{A}(Y - C - w_f)\, L.$$

If Vizier gets signal $s = Strong$, but actual type $t = Weak$, which happens with probability $(1-\theta)(1-q)$, then Dictator gets

$$(Y - C - w_f)\, G(L) + (Y - w_b)(1 - G(L)) = \frac{1}{A}(w_b - w_f - C)\, L + Y - w_b.$$

Lemma 1 *The incentive contract that maximizes Dictator's utility given that Vizier betrays if and only if inequality (1) holds, has $w_n = w_b = 0$ and $w_f = w_e > 0$.*

Lemma 1 allows us to denote $w = w_f = w_e$. Now the payoff of Dictator equals

$$U^D = \theta (1-q)(Y-w) + q(Y-C-w)G(L) + (1-\theta)(1-q)(Y-(w+C)G(L)), \qquad (2)$$

where

$$G(L) = \frac{L}{A} = w\left(1 + (1-\theta)\frac{1-q}{q}\right)$$

Solving Dictator's optimization problem,

$$\max_{\theta,w} U^D(\theta, w; Y, C, A, q)$$

we arrive to the following result (for the sake of tractability, we consider the case where all solutions are interior only; all qualitative results go through for corner solutions as well).

Proposition 2 *Given the ex-ante probability that Enemy is strong, q, the level of optimal competence for Vizier is*

$$\theta^*(q) = 1 - \frac{1}{1-q}\left(\sqrt{\frac{Aq}{C}} - q\right). \qquad (3)$$

The dictator pays such Vizier optimal wage

$$w^* = \frac{A+Y}{2}\sqrt{\frac{qC}{A}} - C, \qquad (4)$$

and the bribe that Enemy needs to offer is

$$B^* = \frac{A+Y}{2} - \sqrt{\frac{AC}{q}}. \qquad (5)$$

The formal results of Proposition 2 allow to analyze comparative statics. The equilibrium competence θ^* decreases in A, which parametrizes Enemy's expected ability to compensate Vizier for betrayal, and increases in C, which is a cost of precautionary measures. This is intuitive: when prospective challengers have access to significant resources, Dictator has to put more emphasis on loyalty, rather than on competence. A more loyal Vizier has lower benefits of betrayal as he is more uncertain about Enemy's prospects, and thus requires a higher bribe for cooperation with Enemy. With respect to the cost of taking precautionary measures, C, the economic intuition is straightforward. A more competent Vizier allocates Dictator's resources better than a less competent one. Thus, increasing costs of protection requires a more competent Vizier to deal with them. Machiavelli wrote in *The Prince*: "Let him [the vizier] see that he cannot stand alone, so that many honors not make him desire more, many riches make him wish for more, and that many cares may make him dread changes. ... otherwise, the end will always be disastrous for either one [the prince] or the other [the vizier]."

When are the challengers are able to commit to reward the traitor? One such situation might be that the Vizier has his own political base, be it a certain ethnic or military faction, with a certain degree of affinity with the dictator's potential enemies. Thus, a dictator who thinks of bringing a local warlord to the central government might be interested in increasing the vizier's loyalty. For instance, the practice of treating family members as de-facto hostages was common not only in medieval Khorezm and 12th century England (Bartlet, 2002), but was widely practiced in most totalitarian dictatorships of the 20th century.

Proposition **??** summarizes the above discussion.

Proposition 3 *In a unique Bayesian perfect equilibrium, the optimal competence of Vizier, θ^*, chosen by Dictator (i) decreases with the maximal amount of resources, A, available to Enemy; (ii) increases with the cost of precautionary measures, C, and (iii) decreases with the probability that Enemy is strong relative to incumbent Dictator, q. The wage of the vizier that he gets in the case of no betrayal, w^*, and the equilibrium bribe B^* both increase in the dictator's utility from being at power Y, and in the likelihood of a strong Enemy type q. Furthermore, bribe level B^* is decreasing in C.*

Proposition 3 states that a less competent lieutenant is more likely to be chosen when either the dictator is weak relative to potential challengers or the dictator values his power relative to the cost he bears when precautionary measures are taken. Indeed, a higher C, the cost of fighting that subtracts from Dictator's value of staying in office, implies a higher competence of the vizier. Moreover, high C increases Dictator's tolearance to betrayals, as sometimes Vizier gets a wrong signal, and betrayal saves Dictator the cost of defense; as a result, Dictator is willing to allow Vizier to be bribed more easily. An increase in the probability that Enemy is strong enough to unseat the incumbent, q, makes a Vizier's betrayal more likely; thus Dictator has to put more emphasis on loyalty at the expense of competence. Furthermore, Dictator has to compensate Vizier more for his loyalty.

One instance where the above analysis has direct implications is the conduct of international negotiations by authoritarian regimes. Unlike their predecessors, modern dictators rarely negotiate on their own. Thus, the choice of a negotiator involves the trade-off we explore: the dictator has to choose a negotiator who is competent enough to bring agreement on favorable terms, yet too much competence might make the negotiator more sensitive to personal alternatives provided by the other side. Kydd (2002) argues that a biased mediator might be more effective in conveying a message to a party in negotiations as a mediator biased towards the recipient of the signal can deliver more credible threats. Dictators, however, often treat suggestions to negotiate as treason, and this may

be fatal for subordinates who offer to negotiate. (Since Kydd, 2002, considers mediator's loyalty as an exogenously parameter, this problem does not arise in his model.)

4.2 Enemy's Problem

At the previous step of the backward induction, we treated Enemy's behavior as given. Now we consider Enemy's decision to launch a coup against the incumbent as a function of information that he has about the stability of the regime. Thus, the optimal strategies of Dictator and Vizier, chosen by Dictator, which we derived above, determine Enemy's payoffs.

Both Dictator and Vizier know that Enemy's *ex-ante* probability of being strong is $p = \frac{1}{2}$, and that Enemy makes his decision to launch a coup conditional on a private signal z he receives. Suppose that both Dictator and Vizier believe that upon receiving a signal of at least $\overline{z}$, Enemy attacks. The *ex-ante* probability of getting such signal is

$$\frac{1}{2}\int_{\overline{z}}^{1} 2zdz + \frac{1}{2}\int_{\overline{z}}^{1} 2\left(1-z\right)dz = \frac{1}{2}\int_{\overline{z}}^{1} 2dz = 1-\overline{z}.$$

Conditional on the fact that Enemy does launch a coup, the probability that Enemy is strong, q, equals $q\left(\overline{z}\right) = \frac{1}{2}\left(1+\overline{z}\right)$ (because the enemy's signal has a uniform distribution as we assumed $p = \frac{1}{2}$). As follows from Proposition 2,

$$\begin{aligned}
\theta^*\left(q\left(\overline{z}\right)\right) &= 1 - \frac{1}{1-q\left(\overline{z}\right)}\left(\sqrt{\frac{Aq\left(\overline{z}\right)}{C}} - q\left(\overline{z}\right)\right), \\
w^*\left(q\left(\overline{z}\right)\right) &= \frac{A+Y}{2}\sqrt{\frac{q\left(\overline{z}\right)C}{A}} - C, \\
B^*\left(q\left(\overline{z}\right)\right) &= B^* = \frac{A+Y}{2} - \sqrt{\frac{AC}{q\left(\overline{z}\right)}}.
\end{aligned}$$

Let us compute Enemy's utility if his type is z, and enemies with types at least $\overline{z}$ attack. Enemy wins if the following conditions are met: he is strong (type $t = \mathit{Strong}$) and Vizier chooses to help Enemy; otherwise he fails. The probability of winning, from Enemy's perspective is, therefore, $z \cdot \Pr\left(\overline{B} \geq B^*\right) = z\left(1 - B^*/A\right)$: indeed, Vizier will help a strong Enemy whenever the latter has sufficient money to bribe Vizier, and on the other hand, Enemy will bribe Vizier whenever he has enough resources (see Appendix for a formal proof). Enemy, whenever he has the money to bribe Vizier, will offer him B^*, while keeping $\overline{B} - B^*$ for himself. Due to uniform distribution, the average payoff Enemy gets, conditional on winning, is $Y_e + \left(A + B^*\right)/2$. Conditional on losing, Enemy gets his punishment $-D$. Summing up, the utility of Enemy equals

$$\begin{aligned}
U\left(z,\overline{z}\right) &= z\left(1 - \frac{B^*\left(q\left(\overline{z}\right)\right)}{A}\right)\left(Y_e + \frac{A + B^*\left(q\left(\overline{z}\right)\right)}{2}\right) - \left(1 - z\left(1 - \frac{B^*\left(q\left(\overline{z}\right)\right)}{A}\right)\right)D \qquad (6) \\
&= z\left(1 - \frac{B^*\left(q\left(\overline{z}\right)\right)}{A}\right)\left(Y_e + D + \frac{A + B^*\left(q\left(\overline{z}\right)\right)}{2}\right) - D.
\end{aligned}$$

This formula is clearly continuous in z; hence, type $\overline{z}$ of enemy must be indifferent between attacking and not attacking. This gives us the following equilibrium condition (for an interior equilibrium, i.e., one where $\overline{z} \in (0,1)$; in the Appendix we prove that under Assumption 1 all equilibria are interior).

$$\overline{z}\left(1-\frac{B^*(\overline{z})}{A}\right)\left(Y_e+D+\frac{A+B^*(\overline{z})}{2}\right)=D. \tag{7}$$

Before proceeding, let us discuss the following trade-off for the enemy. If fewer Enemy types attack, the average attacker is perceived, by both Dictator and Vizier, to be stronger. This inspires Vizier, all things equal, to betray with a higher probability. Dictator has two means to counter this: raise Vizier's wage, or choose a dumber Vizier. As we know from Proposition 3, in this case Dictator uses both tools: he chooses a less competent Vizier and pays him more. These two effects unambiguously increase the equilibrium bribe that Enemy has to pay, and this makes each Enemy's type worse off. Potentially, this could lead to multiple equilibria: if many Enemy types attack, an average plot is weak, Vizier is smart and gets a relatively small wage – so attacking is profitable even for relatively weak Enemies. If few Enemy types attack, each plot is a real threat, so the dictator chooses a smart Vizier and pays him a lot. This is an interesting possibility, and for some parameter values this may be the case. However, under very natural assumptions the equilibrium is unique, and we focus on this case.

Proposition 4 *There is a unique equilibrium characterized by a threshold $\overline{z} \in [0,1]$, where Enemies with types higher than $\overline{z}$ attack and Enemies with types lower than $\overline{z}$ do not attack. This threshold $\overline{z}$ is increasing in D (higher punishment implies that only very confident Enemies attack), increases in Y and decreases in Y_e (a plot is less likely if Dictator values power a lot and Enemy values power a little, but on average, plots are relatively dangerous). It also decreases as C increases (more costly defense implies Dictator is more reluctant to use it, and this gives more Enemy types a chance).*

The result of Proposition 4 is very intuitive. The equilibrium is unique and is characterized by an interior threshold $\overline{z} \in (0,1)$. A higher threshold $\overline{z}$ means less frequent, but more fierce plots. Not surprisingly, this would be the case if Enemy is strongly punished if he fails, or does not value power very much, while Dictator values power (this would be the case, for example, if Dictator is an autocrat and Enemy is a collective body, or a potential democratic ruler who would not be able to get all the benefits of power). The comparative statics with respect to the value of power, Y, Y_e, and C, follow from the fact that the left-hand side of (7) is increasing in q.

We now combine the results of Proposition 3 and Proposition 4 to get our main comparative statics result.

Proposition 5 *Vizier's competence level, θ^*, increases in C and Y_e, but decreases in D and Y.*

5 Extensions

5.1 Succession

Once an absence of ordered continuance was considered a major drawback of non-hereditary dictatorship as a form of government (Herz, 1952, Spearman, 1939, Olson, 1993).[11] However, in the first half of the 20th century a number of once-dictatorial regimes survived the death of their founding fathers (e.g., Lenin in Russia and Kemal Ataturk in Turkey). Nowadays, the technology of succession appears to be advanced enough to produce successful transitions in such diverse countries as Syria in 2000, North Korea in 1994, China in 1989, and Congo in 2003. Our model predicts that a ruler with a longer time horizon, e.g., resulting from the assurance of a desired succession, has more incentives to hire the most able agents. Additional support for this result comes from the the last years of kings from the largest European monarchies in England, France, and Russia before they were executed by revolutionaries At the time they lost the crown, all these monarchs had very young heirs incapable of grasping power if their fathers were dead. And, the last years of each of these rulers were marred by the colossal incompetence of their prime ministers.

Consider the following extension to the previous formal analysis. There is an infinite number of periods, and in each period there is a ruler. The rulers live for one period; however, they may care about the next ruler (their dynasty). Specifically, the successor may be either desirable for the dictator or not. In the first case, the successor's utility is added to that of the dictator with a discount factor $\beta < 1$. In the latter case, the dictator does not care about his successor's utility at all. We may interpret β as a measure of affinity between the dictator and his successor. It is natural to think that β is high in the case of monarchy, but low in the case of army colonels succeeding one another.

Each period is characterized by the incumbent dictator's ability to ensure succession to a desirable heir. Specifically, the state either provides for a secure succession (S) or not (I). If Dictator wins his encounter with Enemy, he is able to ensure that the successor is (i) desired and (ii) the next state is S. However, if Dictator loses in state S, then his successor is the Dictator's heir with probability $P_S < 1$, and the state becomes I. If Dictator loses to Enemy in state I, his successor is the Dictator's heir with probability P_I, $P_I < P_S$, and the next state is I. With complementary probabilities ($1 - P_S$ if the current state is S and $1 - P_I$ if the current state is I), Enemy takes over and becomes the next dictator; the next state is I.

Proposition 6 *In the dynamic game, there exists a unique Markov Perfect equilibrium. In this*

[11] Twenty years after Herz's article was completed, the last of the European dictators that came into power in 1930s, General Franco of Spain, successfully transferred power to a designated successor.

equilibrium, $U_S > U_I$, and thus the competence of Vizier is lower in state I, than in the state S. If Dictator cares less about his predecessors (β is smaller), the competence of the Vizier is higher both in secure and insecure states.

Proposition 6 asserts that a less sure succession leads to less competent agents. The first result may be used to explain the poor governance of monarchs whose immediate heirs are small children, or have other contenders for the throne (i.e., relatives they do not like). Then, Proposition 6 demonstrates that less desired succession leads to better agents. It helps to explain the difference between 'party-machine' dictatorships such as Mexico in 1940–90, where members of a non-representative selectorate succeed each other as leaders of the country, but have neither desire nor possibility to pass this post to their children, and monarchies, whose rulers have such desire and possibility. The model predicts that a personalist dictatorship is less likely to witness competent advisors than an institutionalized dictatorship. Domínguez (2002) reaffirms that "the most successful authoritarian regimes, namely, historical bureaucratic empires, had means of succession from one monarch to the next and featured bureaucratic organizations for the sharing and exercise of power". Not coincidentally, Mexico, probably the most successful of 20th century dictatorships, had a well-institutionalized procedure for succession for almost six decades.

5.2 Negative Selection

Political scientists (e.g., Lewis, 1978, Linz and Chehabi, 1998) and retired politicians (Speer, 1970) have been long aware that dictatorial rule keeps able people from joining high-level politics. For an economist, this is a familiar case of the Akerlof adverse selection problem: the more severely the dictator punishes those who betrayed him (if he survives the betrayal), the less the ability of agents applying for the job. Hence, the dictator faces a trade-off between high incentives for agents already on the job, which are provided by harsh punishment for betrayal, and low incentives to encourage potential applicants to apply for the job. Indeed, the harsher the punishment for betrayal is, the lower is the expected utility of a competent advisor. Since it is the agent's competence that allows him to discriminate among potential plotters, he would never need to use his competence when the price of betrayal is infinite disutility.

Formula (1) allows us to extend the analysis to the environment where potential viziers have a choice whether or not to enter politics at all. The expected benefit of staying loyal for Vizier is equal to $L = w_f + (1-\theta)\frac{1-q}{q}(w_f - w_b)$. Above, we focused on the case where $w_b \geq 0$. However, Dictator may induce more loyalty on Vizier's behalf if he can actually punish Vizier for treason should he survive, i.e. have $w_b < 0$. Though providing better incentives for those who are on the job, this reduces expected utility of competent viziers. Thus, if there is some reservation utility

of an agent of type θ, $H(\theta)$, which is a continuously differentiable function of θ and $H'(\theta) > 0$, then certainly there is a trade-off between "loyalty" and "attractiveness of the job." Then, for a sufficiently high punishment, only relatively incompetent advisors are self-selected.[12]

Thus, a dictator has incentives to commit to an optimal punishment that is less than execution. However, the very nature of dictatorships precludes such commitment; in a democracy, it is easier to commit to a mild punishment. In a democracy, though a punishment for political betrayal might be politically severe, it rarely brings significant personal harm. A U.S. President is bound by laws not to kill a cabinet member who pursues his own presidential ambitions, as was the case with Treasury Secretary Salmon Chase in Lincoln's first cabinet (e.g., Dudley, 1932), or Attorney General Robert Kennedy in the first cabinet of President Johnson.[13] Betraying a dictator such as Saddam, Castro, or Marcos might have been more costly for their ministers.[14] The following proposition summarizes the above discussion. Thus, in a relatively mild autocracy, leaders are more exposed to political treason, but the pool of applicants to the agent's position is likely to be better. Conversely, the bloodiest dictator may feel relatively safe from betrayal, but the agents he will have to choose from will be extremely incompetent.

One potential counter argument is that the dictator could enter the private labor market and selectively depress rewards for competence, say, by threatening the family members of potential agents if the agent refuses to enter his service.[15] While this argument certainly does have merit when applied to a single agent, this approach seems impossible on a large scale.[16] Mass emigration

[12] The working paper version contains formal assertions and proofs.

[13] In a non-technical note, Edwards (2001) points to the same loyalty-vs.-competence trade-off in recent low-level presidential appointments in the U.S.

[14] In January 1984, the honorary title of 'Hero of the Cuban Republic' was conferred upon Gen. Arnaldo Ochoa in recognition of his extraordinary contributions to the insurrection against Batista, to the consolidation of the nation's defense, and for his service in international missions. In June 1989, MINFAR Minister Raul Castro explained that Gen. Ochoa 'was no longer the rebel soldier, the invader of Camilo's column, the internationalist in Venezuela, the commander of our troops in Ethiopia.' In July 1989, the prosecutor's closing remarks stated that 'it became evident that we were confronted with a crime of treason committed against the fatherland, against the people, against his superiors, and against the very idea of what a revolutionary, a military chief, and a Cuban internationalist fighter really is.' In accordance with the 'sentence dictated by the Special Military Court, Case No. 1 of 1989,' Gen. Arnaldo Ochoa and three others faced a firing squad in July 1989. (Alfonso, 1989 and sources cited therein.)

[15] Gershenson and Grossman (2001) analyze how both cooptation and repression were employed to encourage loyalty to the Soviet regime.

[16] Political scientists working on modern dictatorships have long been aware of the problem to find a rationale for either 'random' terror against population or 'purges' against loyal members of the regime (see Friedrich and Brzezinski, 1956, p. 150-151 for discussion of the difference; also, Arendt, 1951). The idea of suppressing the reservation utility of those who might have choosen to deliberately abstain from politics/government might provide such a rationale. Another possible policy is restrictions on emigration, a common feature of many authoritarian regimes.

is a most clear indication of unfavorable circumstances for talented people. In the first five years of the Mussolini regime, one and half million people left Italy (Cannistraro and Rosoli, 1979). In Haiti, Trujilho "used all means at his disposal to reinforce the natural isolation" (Hartlyn, 1998). Furthermore, the exile of the political and intellectual elite, which is a tiny fraction of any country's population, might not be easily detected by crude statistical data. For example, the departure of Albert Einstein, Joseph Schumpeter, Thomas Mann, and John von Neumann preceded mass emigration of the intellectual elite from Europe, but might have had a more profound impact on the intellectual, and by implication, political life of their home countries. Thus, even for individual geniuses, providing the incentives to work in a certain political environment might be a complicated task for the dictator.[17]

6 Conclusion

In a recent inquiry into the dynamic nature of dictatorships, Acemoglu, Robinson, and Verdier (2004) suggest that "while the academic study of strongly-institutionalized polities is well advanced, there are few studies, and less of a consensus, on the nature of weakly-institutionalized polities." Poor governance in, and the degeneration of, mature dictatorships allow for a number of plausible explanations. These include the greediness and selfishness of the dictator, as well as his personal incompetence and inability to listen and follow advice. We use the formal apparatus of economic theory to investigate agency problems in dictatorships as compared to democracies. We demonstrate that it is the unwillingness and inability of the dictator, fearful of opportunistic behavior by the agent and potential betrayal, to surround himself with competent associates that causes the poor performance of dictatorships in the long run. Since the definition of competence we use is, in a sense, all-encompassing, the resulting incompetence will sooner or later have an adverse effect on the policies carried out and consequently on economic performance and social welfare. The most profound effect to be felt in neo-sultanistic regimes (Chehabi and Linz, 1998) and "control regimes" (Bates, 2004) , which rely on government intervention as the primary mechanism of resource allocation.[18]

[17] In the much less frightening circumstances of the last decades of the Soviet rule, talented young Russians chose mathematics and the natural sciences, generally avoiding politics (and, e.g., political science) as an occupation. One result, besides flourishing science, was that political positions were often occupied by profoundly mediocre appointees.

[18] The economic performance of dictatorships is a recurring topic for empirical research (e.g., see Epstein et al., 2004, and Przeworski et al., 2000, for opposing views; see also Persson, 2002, Gandhi, 2005). While acknowledging that the emerging consensus in recent empirical studies does emphasize the advantages of democracy, Glaeser et al. (2004) argue that a dictatorial rule might be conductive for economic growth. For medieval times with unreliable estimates of the economic growth, De Long and Shleifer (1993) find that "a region ruled by an absolutist prince saw

There is a strand in the literature on dictatorships that argues that the dictators have an advantage in choosing the most able man for government positions, while in democracies the first-best choice may be impossible (e.g., de Tocqueville, 2000, originally published in 1831). Though there is a certain merit to this point, the circumstances in which a dictator has this advantage are limited. One such situation appears when a new dictator emerges after years of political stagnation or political turmoil, bringing a whole class of politically young and able people with him. However, though emergence of new faces in politics or government may coincide with the accession of a dictator, it might be the same political wave that removed the former elite that both made a new dictator possible and extended the opportunities of other talented individuals. One example might be Napoleon's famous marshals, a group of brilliant military officers of plebeian origin who pursued their army careers to a point previously reserved to people of noble origin only. Though their military glory came in full under Napoleon's command in the early 1800s, it was the French revolution of the earlier decade that made a dramatic break in their careers possible.[19]

Probably the most prominent modern theory highlighting the advantages of dictatorship is Mancur Olson's "stationary bandit" paradigm (Olson, 1993).[20] As Wintrobe (2000) rightly observes (see also Haber 2005), "the problem with Olson's analysis is that, comparing dictatorships, the worst regimes in human history appear to be precisely those such as Nazi Germany, Soviet Russia, or Cambodia which appear to have been the most encompassing". The agency theory of dictatorships suggests an explanation why even a benevolent dictator may fail to implement a socially desirable policy. The loyalty-competence trade-off, which is much more severe when commitment mechanisms are weak, is in a sense an indispensable feature of any unconstrained dictatorship. Even if a powerful dictator reads this paper, and understands the logic, it gives no help to him if he is insistent on keeping his power unrestricted. Until he opts for a sustainable delegation of power to other political institutions, he will have no opportunity to improve the quality of his ministers.

its total urban population shrink by one hundred thousand people per century relative to a region without absolutist government."

[19] Supporting our basic story, Napoleon's Marshal Jean-Batist Bernadotte – in Napoleon's opinion, one of the two marshals with a war talent equal to that of the Emperor himself – left Napoleon not out of fear of ultimate defeat, but at the zenith of Napoleon's power in 1811. The other military genius, General Moreau, left Napoleon – via participation in an unsuccessful plot – even earlier, in 1803.

[20] The idea of a stationary bandit can of course be traced back to Hobbes, who appraised monarchy as a system where public affairs are run perfectly because they are actually private. A formal model can be found in McGuire and Olson (1996). Epstein and Rosendorff (2004) analyze what might prevent an autocrat from pursuing a growth-enhancing policy.

References

Acemoglu, Daron (2003) Why Not a Political Coase Theorem? Social Conflict, Commitment and Politics, *Journal of Comparative Economics,* Vol. 31, pp. 620–652.

Acemoglu, Daron, and Robinson, James (2001) A Theory of Political Transitions, *American Economic Review,* Vol. 91, pp. 938–963.

Acemoglu, Daron, Robinson, James, and Verdier, Thierry (2004) Kleptocracy and Divide-and-Rule: A Model of Personal Rule, The Alfred Marshall Lecture, *Journal of the European Economic Association Papers and Proceedings,* April–May 2004, Vol. 2, pp. 162–192.

Arendt, Hanna (1951) *Origins of Totalitarianism,* New York.

Bartlet, Robert (2002) *England Under the Norman and Angevin Kings, 1075-1225,* Oxford University Press, Oxford, UK.

Bates, Robert (2004) The Political Economy of Conrol Regimes, mimeo.

Brooker, Paul. (2000) *Non-Democratic Regimes: Theory, Government, and Politics.* New York: St. Martin's Press.

Bueno de Mesquita, Bruce, Smith, Alastair, Silverson, Randolph, and Morrow, James (2003) *The Logic of Political Survival*, MIT Press, Cambridge.

Burkart, Mike, Panunzi, Fausto, and Shleifer, Andrei (2003) Family Firms, *Journal of Finance,* Vol. 58, pp. 2167–2202.

Carrillo, Juan D. and Mariotti, Thomas (2001) Electoral Competition and Politicians Turnover, *European Economic Review*, Vol. 45, pp. 1–25.

Cannistraro, Philip V. and Rosoli, Gianfausto (1979) Fascist Emigration Policy in the 1920s: an Interpretive Framework, *International Migration Review,* Vol. 13, pp. 673–692.

Conquest, Robert (1968) *The Great Terror: Stalin's Purge of the Thirties,* Macmillan: NY.

Cook, Susan E. ed. (2004) Genocide in Cambodia and Rwanda, YCIAS/GSP Monograph Series No. 1.

De Tocqueville, Alexis (2000) *Democracy in America,* Chicago Univ. Press: Chicago.

De Long, Bradford J. and Andrei Shleifer (1993) Princes and Merchants: European City Growth before the Industrial Revolution, *Journal of Law and Economics* Vol. 36, No. 2, pp. 671–702.

Domínguez, Jorge I. (2002) The Perfect Dictatorship? Comparing Authoritarian Rule in South Korea and in Argentina, Brazil, Chile, and Mexico, *mimeo.*

Domínguez, Jorge I. (1998) The Batista Regime in Cuba, in Linz and Chehabi eds. (1998) *Sultanistic Regimes,* Johns Hopkins University Press, Baltimore.

Dudley, Harold M. (1932) The Elections of 1864, *Mississippi Valley Historical Review,* Vol. 18, No. 4, pp. 500–518.

Edwards, George C. (2001) Why Not the Best? The Loyalty-Competence Trade-Off in Presidential Appointments, *The Brookings Review,* Vol. 19, No. 2, pp. 12–16.

Epstein, David, Bates, Robert, Goldstone, Jack, Kristensen, Ida, and O'Halloran, Sharyn (2004) Democratic Transitions, mimeo.

Epstein, David and Rosendorff, Peter (2004) When Are Autocracies Economically Efficient?, mimeo.

Finer, S. E. (1997) *The History of Government from the Earliest Times,* vol. 1-3, Oxford Univ. Press: Oxford.

Friebel, Guido and Raith, Michael (2004) Abuse of Authority and Hierarchical Communication, *RAND Journal of Economics,* Vol. 35. No 2, pp. 224–244.

Friedrich, Carl and Brzezinski, Zbignew (1956) *Totalitarian Dictatorship and Autocracy,* Harvard Univ. Press: Cambridge.

Galetovic, Alexander and Sanhueza, Ricardo (2000) Citizens, Autocrats, and Plotters: A Model and New Evidence on Coups D'´Etat, Economics and Politics, Vol. 12, No. 2, pp. 183–204.

Gallego, Maria and Pitchik, Carolyn (2004) An Economic Theory of Leadership Turnover, *Journal of Public Economics,* Vol. 88 No 12*,, pp.* 2361-2382.

Gandhi, Jennifer (2005) Dictatorial Institutions and their Impact on Economic Growth, mimeo.

Glaeser, Edward, La Porta, Rafael, López-de-Silanes, Florencio, and Shleifer, Andrei (2004) Do Institutions Cause Growth? *Journal of Economic Growth,* Vol. 9, pp. 271–303.

Glazer, Amihai (2002) Allies as Rivals: Internal and External Rent Seeking. *Journal of Economic Behavior and Organization,* Vol. 48, No. 2, pp. 155–162.

Gordon, Michael and Trainor, Brainerd (2006) *Cobra II: The Inside Story of the Invasion and Occupation of Iraq,* Pantheon.

Gregory, Paul (2004) *The Political Economy of Stalinism: Evidence from the Soviet Secret Archives,* Cambridge Univ. Press.

Gershenson, Dmitry and Grossman, Hershel (2001) "Cooption and Repression in the Soviet Union," *Economics and Politics*, 13(1), 31-47.

Grossman, Herschel I. and Noh, Suk Jae (1990) A Theory of Kleptocracy with Probabilistic Survival and Reputation. *Economics and Politics*, Vol. 2, pp. 157–71.

Haber, S. (2005) Authoritarian Government, mimeo.

Heder, Stephen and Brian Tittemore, Brian (2004) Seven Candidates for Prosecution: Accountability for the Crimes of the Khmer Rouge

Herz, John H. (1952) The Problem of Successorship in Dictatorial Régimes; A Study in Comparative Law and Institutions, *Journal of Politics*, Vol. 14, No. 1, pp. 19–40.

Katouzian, Homa (1998) The Pahlavi Regime in Iran, Chehabi and Linz, eds. (1998) *Sultanistic Regimes,* Johns Hopkins University Press, Baltimore, pp. 182-205.

Kiernan, Ben (2004) *The Pol Pot Regime Race, Power, and Genocide in Cambodia under the Khmer Rouge,* 1975–79, Yale Univ. Press, New Haven.

Kydd, Andrew (2003) Which Side Are You On? Bias, Credibility, and Mediation. *American Journal of Political Science,* Vol. 47, No. 4, pp. 597–611.

Lewis, Paul H. (1978) Salazar's Ministerial Elite, 1932–1968, *Journal of Politics*, Vol. 40, No. 3, pp. 622–647.

Linz, Juan and Stepan, Alfred, eds. (1978) *The Breakdown of Democratic Regimes: Latin America,* Johns Hopkins University Press, Baltimore, MD.

Linz, Juan and Chehabi, Houchang, eds. (1998) *Sultanistic Regimes,* Johns Hopkins University Press, Baltimore.

McGuire, Martin C. and Olson, Mancur (1996) The Economics of Autocracy and Majority Rule: The Invisible Hand and the Use of Force. *Journal of Economic Literature,* Vol. 34, No. 1, pp. 72–96.

Montefiore, Simon (2003) *Stalin : The Court of the Red Tsar,* Knopf: New York.

Morris, Stephen (2001) Political Correctness, *Journal of Political Economy,* Vol. 109, No. 2, pp. 231–265.

North, Douglass C. and Weingast, Barry R. (1989) Constitutions and Commitment: The Evolution of Institutional Governing Public Choice in Seventeenth-Century England, *Journal of Economic History,* Vol. 49, No. 4, pp. 803–832.

O'Flaherty, B. (1991) How to Be a Dictator: The Advantages of Incumbency, Columbia University Discussion Paper Series, N. 530.

Olson, Mancur (1993) Dictatorship, Democracy, and Development *American Political Science Review,* Vol. 87, No. 3, pp. 567–576.

Overland, Jody, Simons, Kenneth, and Spagat, Michael (2000) Political Instability and Growth in Dictatorships, *Public Choice.*

Reiter, Dan and Stam, Allan (2003) Identifying the Culprit: Democracy, Dictatorship, and Dispute Inititation, *American Political Science Review,* 97 (2), 333-337.

Peceny, Mark, Caroline C. Beer, and Shannon Sanchez-Terry (2002) "Dictatorial Peace?" American Political Science Review 96 (March): 15–26.

Perrson, T. (2002) Do political institutions shape economic policy?, *Econometrica* 70, 883-905.

Prendergast, Canice (1993) A Theory of 'Yes Men', *American Economic Review,* Vol. 83, No. 4, pp. 757–770.

Prendergast, Canice and Topel, Robert (1996) Favoritism in Organizations, *Journal of Political*

Economy, Vol. 104, pp. 958–978.

Przeworski, Adam (2000) et al. *Democracy and development: Political institutions and well-being in the world,* Cambridge Studies in the Theory of Democracy, Cambridge Univ. Press.

Przeworski, Adam and Limongi, Fernando (1993) Political regimes and economic growth. *Journal of Economic Perspectives,* Vol. 7, pp. 51–69.

Reiter, Dan and Stam, Allan (2003) Identifying the Culprit: Democracy, Dictatorship, and Dispute Inititation, *American Political Science Review,* 97 (2), 333-337.

Restrepo, Jorge and Spagat, Michael (2001) The Dynamics of Repressive Dictatorships, mimeo.

Rindova, Violina P. and Starbuck, William H. (1997) Distrust in Dependence: The Ancient Challenge of Superior-Subordinate Relations. In T.A.R. Clark (Ed.), Advancement of Organization Behaviour: Essays in Honor of Derek Pugh, Dartmouth.

Skocpol, Theda (1979) *States and Social Revolutions: A Comparative Analysis of France, Russia and China,* Cambridge: Cambridge Univ. Press.

Spahr, William (1997) *Stalin's Lieutenants: A Study of Command under Duress* Novato, CA: Presidio Press.

Speer, Albert (1970) *Inside the Third Reich: Memoirs,* The Macmillan Company, New York.

Spearman, Diana (1939) *Modern dictatorship,* J. Cape, London.

Suetonius, Gaius Tranquillus (1979) *The Twelve Caesars.* New York: Penguin.

Thompson, Mark (1998) The Marcos Regime in the Philippines, in Chehabi, Linz, eds. *Sultanistic Regimes,* John Hopkins Univ. Press: Baltimore, pp. 206-230.

Tullock, Gordon (1987) *Autocracy,* Kluwer Academic Publishers: Dordrecht.

Volkogonov, Dmitry (1991) *Stalin: Triumph and Tragedy*; London.

Wagner, Alexander (2004) Loyalty and Competence, mimeo.

Wantchekon, Leonard (2003) The Paradox of 'Warlord' Democracy: A Theoretical Investigation, *American Political Science Review*, Vol. 98, No. 1, pp. 17–33.

Wintrobe, Ronald (1990) The Tinpot and the Totalitarian: An Economic Theory of Dictatorship. *American Political Science Review*, Vol. 84, No. 3, September 1990, pp. 849–872.

Wintrobe, Ronald (1998) *The Political Economy of Dictatorship,* Cambridge Univ. Press.

Wintrobe, Ronald (2000) Dictatorship, mimeo.

Appendix

Proof of Proposition 1. The payment to Vizier when Enemy decides not to attack, w_n, should certainly be set to the minimal value 0. Suppose $w_b > 0$. Then Dictator would be better off by decreasing w_b, as this would increase L, thus making Vizier more loyal and decreasing Dictators's payment to Vizier in case of betrayal. Hence, $w_b = 0$ in the optimal contract. Suppose $w_f > w_e$. In that case, Vizier, when facing a weak plot (i.e., getting signal $s = Weak$, which unambiguously means $t = Weak$) will strictly prefer to fight (in which case he gets w_f) rather than to allow the plot to unravel (in which case he gets w_e, as this is not a betrayal). If, however, Vizier gets a strong signal, he may betray Dictator. Given that, Dictator would be better off choosing to fight regardless of Vizier's advice. If, instead, $w_e > w_f$, then Dictator would be better off if he decreased w_e slightly. Finally, consider the possibility $w_f = w_e = 0$. But then Vizier would betray Dictator every time he receives a strong signal, i.e., he would never defend. However, then Dictator could without any help of Vizier.■

Proof of Proposition 2. Denote $k = 1 + (1-\theta)\frac{1-q}{q} \geq 1$. Then the Dictator's utility (if Enemy chooses to attack) then equals

$$U^D = Y\left(1 - q + \frac{1}{A}kqw\right) - (1-kq)\,w - \frac{1}{A}k^2qw\,(C+w)\,.$$

Here, the first term reflects the benefits of survival times the probability of survival, the second term is the wage paid if Vizier got a weak signal and did not defend, while the last one is the expenses on defense and wage if Vizier chooses to fight. We now have (omitting the index D)

$$\begin{aligned}
\frac{\partial U}{\partial k} &= \frac{1}{A}qw\,(A + Y - 2Ck - 2kw)\,,\\
\frac{\partial U}{\partial w} &= -\frac{1}{A}\left(A + Ck^2q + 2k^2qw - Akq - Ykq\right),\\
\frac{\partial^2 U}{\partial k^2} &= -\frac{2}{A}qw\,(C+w) < 0,\\
\frac{\partial^2 U}{\partial w^2} &= -\frac{2}{A}k^2q < 0,\\
\frac{\partial^2 U}{\partial k \partial w} &= \frac{1}{A}\,(Aq + Yq - 2Ckq - 4kqw)\,.
\end{aligned}$$

The first two equations give us the first-order conditions, while the last three ones allow us to compute the hessian, which equals

$$\frac{2}{A}qw\,(C+w)\,\frac{2}{A}k^2q - \left(\frac{1}{A}\,(Aq + Yq - 2Ckq - 4kqw)\right)^2.$$

We need to verify that if is negative, provided that the first-order conditions hold. Substituting

$k = \frac{1}{2}\frac{A+Y}{C+w}$ (which follows from the condition $\frac{\partial U}{\partial k} = 0$), the Hessian reduces to

$$Cw\frac{(A+Y)^2 q^2}{(C+w)^2 A^2} > 0.$$

Consequently, the solution to the first-order conditions $\frac{\partial U}{\partial k} = 0$, $\frac{\partial U}{\partial w} = 0$ gives a global maximum, provided that it is unique. To verify uniqueness, let us find the optimal w for a given k from $\frac{\partial U}{\partial w} = 0$; we obtain

$$w = \frac{Akq + Ykq - Ck^2q - A}{2k^2q}.$$

Plugging this into the equation

$$A + Y - 2Ck - 2kw = 0,$$

which follows from $\frac{\partial U}{\partial k} = 0$, we get

$$\frac{1}{kq}\left(A - Ck^2q\right) = 0.$$

Consequently,

$$k = \sqrt{\frac{A}{Cq}}.$$

From this we obtain the required formulas, which give the unique solution to the Dictator's maximization problem:

$$\begin{aligned}
\theta^*(q) &= 1 - \frac{1}{1-q}\left(\sqrt{\frac{Aq}{C}} - q\right), \\
w^* &= \frac{A+Y}{2}\sqrt{\frac{qC}{A}} - C, \\
B^* &= \frac{A+Y}{2} - \sqrt{\frac{AC}{q}}.
\end{aligned}$$

This completes the proof.■

Proof of Proposition 3. The comparative statics of Vizier's competence θ^* with respect to A and C follows straightforwardly from (3). To find that it decreases in q, compute the derivative

$$\frac{d\theta^*(q)}{dq} = -\frac{1}{2Aq(1-q)^2}\left(1 - 2\sqrt{\frac{C}{A}}q + q\right)\sqrt{\frac{q}{AC}}.$$

We have

$$1 - 2\sqrt{\frac{C}{A}}q + q > 1 - 2\sqrt{q} + q = (1-\sqrt{q})^2 \geq 0,$$

since $C < A$ by assumption. Consequently, θ^* is decreasing in q.

The Vizier's wage and the equilibrium bribe are increasing in Y and q, as immediately follows from (4) and (5). Similarly, the equilibrium bribe is decreasing in C, as follows from (5). ■

Proof of Proposition 4. Since equilibrium threshold $\overline{z}$ is defined by (7) and $\overline{z} = 2q - 1$, to prove uniqueness it suffices to show that

$$(2q-1)\left(1-\frac{B^*(q)}{A}\right)\left(Y_e + D + \frac{A+B^*(q)}{2}\right)$$

is increasing in q. From Proposition 3 we know that $B^*(q)$, and thus the entire last factor, is increasing in q. Consequently, it is sufficient to prove that $(2q-1)\left(1-\frac{B^*(q)}{A}\right)$ is increasing in q. We have

$$\begin{aligned}(2q-1)\left(1-\frac{B^*(q)}{A}\right) &= (2q-1)\left(1-\frac{\frac{A+Y}{2}-\sqrt{\frac{AC}{q}}}{A}\right)\\ &= (2q-1)\left(\frac{1}{2}-\frac{Y}{2A}+\sqrt{\frac{C}{Aq}}\right).\end{aligned}$$

Differentiating with respect to q yields

$$\frac{\partial}{\partial q}\left((2q-1)\left(\frac{1}{2}-\frac{Y}{2A}+\sqrt{\frac{C}{Aq}}\right)\right) = \frac{1}{2Aq}\left(A\sqrt{\frac{1}{A}\frac{C}{q}}+2Aq-2Yq+2Aq\sqrt{\frac{1}{A}\frac{C}{q}}\right) > 0,$$

since by Assumption 1 $A > Y$. Hence, equation (7) has at most one solution. If it does, this is the only equilibrium, since $\overline{z} = 0$ cannot be an equilibrium threshold (enemies who get signal $z = 0$ will never find it optimal to attack), while if $\overline{z} = 1$ so that no Enemy attacks, the strongest enemies would deviate and attack, since then the right-hand side of (7) is larger than D. If D is large enough, equation (7) may fail to have solutions on $[0,1]$, and then $\overline{z} = 1$ provides an equilibrium threshold, so no Enemy attacks because of prohibitively high punishment. This proves the uniqueness of equilibrium threshold.

To show that the solution to (7) is increasing in D, observe that

$$\frac{\partial}{\partial D}\left(\overline{z}\left(1-\frac{B^*(q(\overline{z}))}{A}\right)\left(Y_e+D+\frac{A+B^*(q(\overline{z}))}{2}\right)-D\right) = \overline{z}\left(1-\frac{B^*(q(\overline{z}))}{A}\right)-1 < 0.$$

So, if D increases, a higher $\overline{z}$ is required to satisfy (7). Similarly, the left-hand side of (7) is increasing in Y_e (since $B^*(q(\overline{z}))$ does not depend on Y^e), so $\overline{z}$ is decreasing in Y_e. Observe now that the left-hand side is decreasing in B^*, as it may be rewritten as

$$\overline{z}\left(\left(1-\frac{B^*}{A}\right)(Y_e+D)+\frac{1}{2A}\left(A^2-(B^*)^2\right)\right).$$

Consequently, it is decreasing in Y and increasing in C, as follows from Proposition 3. This implies that $\overline{z}$ is increasing in Y and decreasing in C, which completes the proof. ■

Proof of Proposition 6. We start by writing down the utility functions of and Enemy in each of the two situations. For $X = S, I$ we have

$$\begin{aligned} U_X &= f_X(U_S, U_I) = (2q_X - 1)(Y + \beta U_S) + (Y + \beta U_S - \beta P_X U_I)(1 - q_X + q_X G_X)(2 - 2q_X) \\ &\quad - w_X(\theta_X(1 - q_X) + (q_X + (1 - \theta_X)(1 - q_X))G_X)(2 - 2q_X) \\ &\quad - C(q_X + (1 - \theta_X)(1 - q_X))G_X + \beta(P_X U_I)(2 - 2q_X), \\ 0 &= (2q_X - 1)\left(1 - \frac{B^*(q_X)}{A}\right)\left((1 - P_X)\beta U_I + D + \frac{A + B^*(q_X)}{2}\right) - D. \end{aligned}$$

To show that the equilibrium is unique, suppose that U_I increases. This means, using the results of Proposition 4, that both q_S and q_I should be lower for the latter equation to hold, as more enemies would now prefer to attack. However, both f_S and f_I are increasing in q_S and q_I, respectively, since higher q implies that fewer enemies actually attack. Consequently, if q_S and q_I decrease, it must be that f_I decreases. But in equilibrium it equals U_I; hence, U_I is uniquely defined in equilibrium. But then q_S and q_I are uniquely defined, and the equation $U_S = f_S(U_S, U_I)$ defines a contracting mapping for U_S, which is thus also uniquely determined. But since utilities on the right-hand sides are uniquely defined, we immediately obtain uniqueness as an immediate corollary of Proposition 4.

To show that in this equilibrium, $U_S > U_I$, consider the mapping for the equilibrium values of q_S and q_I given by $U_S = f_S(U_S, U_I)$, $U_I = f_I(U_S, U_I)$. The mapping is contracting (in sup-metrics), and iterations converge to the equilibrium values of U_S and U_I. It is easy to see, however, that the inequality $U_S > U_I$ is preserved under this mapping, and so in the limit $U_S \geq U_I$. However, as $U_S \neq U_I$, we must have that $U_S > U_I$. Now Proposition 3, together with inequality $P_S > P_I$, implies that $\theta_S > \theta_I$.

Finally, we need to show that lower β leads to higher competence of Vizier. Suppose, to obtain a contradiction, that βU_I increases. Then q_S and q_I are lower, and, as before, we find that both U_S and U_I must decrease (lower β reinforces the effect). Hence, βU_I decreases, which implies that q_S and q_I are higher. Now again consider the mapping (f_S, f_I) for the new lower β and higher q_S and q_I. For any arguments U_S and U_I such that $U_S > U_I$, f_S and f_I are now lower. This implies that in the new equilibrium, U_S and U_I are lower. Moreover, since $\theta_S > \theta_I$ and thus $q_S < q_I$, U_S is decreasing faster than U_I, and so $Y + \beta U_S - \beta P_S U_I$ and $Y + \beta U_S - \beta P_I U_I$ are decreasing. But then the competence of Vizier becomes higher as β becomes lower both in state S and in state I. ■